



TREE MANAGEMENT CONSULTING ARBORICULTURISTS

ARBORICULTURAL ASSESSMENT

for

Mr Ian Walters
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SITE ADDRESS
13 BRUCE STREET
WARRIEWOOD NSW

OCTOBER 2004

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SUMMARY

A proposal to redevelop 13 Bruce Street, Warriewood is the subject of a development application to Pittwater Council, and the site contains five existing trees.

Two mature palms are present on site and the native species to be retained and transplanted to a new position on site, whilst the Canary island date palm is proposed for removal and replacement with two mature native palms. The large Norfolk Pine is to be retained and two, semi-mature specimens of species exempt from Pittwater Council's Tree Preservation Order are proposed for removal.

On 9th October 2004, an arboricultural inspection and assessment of the existing trees at 13 Bruce Street, Warriewood, was carried out by the author of this document.

The author supports the applicant's proposal and believes it to be a reasonable development of the site.

The author gives specific and detailed recommendations for the protection of trees to be retained within the subject site, and a tree transplanting methodology.

1 INTRODUCTION

- 1.1 This Arboricultural Assessment was commissioned by Ian Walters, owner of the subject site.
- 1.2 The subject site is identified as Lot 10 in DP 15762, LGA Pittwater and known as 13 Bruce Street, Warriewood New South Wales.
- 1.3 This Arboricultural Assessment assesses the health and condition of surveyed trees, and examines the possible development impacts on trees in proximity to the proposal.
This Arboricultural Assessment gives recommendations as to the retention or removal of trees on the site based on their Safe Useful Life Expectancy, and gives recommendations to minimize any identified impacts from the proposed development.
- 1.4 Information contained in this Arboricultural Assessment covers only the trees that were examined and reflects the condition of the trees at the time of inspection. Care has been taken to obtain all information from reliable sources. All data has been verified as far as possible; however, I can neither guarantee nor be responsible for the accuracy of information provided by others.
- 1.5 This Arboricultural Assessment is not intended as an assessment of any impacts on trees by any proposed future development of the site other than the current development application.

2 METHODOLOGY

- 2.1 In preparation for this report a ground level visual tree assessment (Mattheck 1994) was undertaken by the author of this Arboricultural Assessment on Saturday 9th October, 2004.
- 2.2 The inspection was limited to visual examination of the subject trees without dissection, excavation, probing or coring.
No aerial (climbing) inspections, woody tissue testing or tree root investigation was undertaken as part of this tree assessment.
- 2.3 Tree height and canopy spread of the subject trees was estimated and expressed in metres.
Trunk diameter at breast height (*DBH*) was estimated at approximately 1.4 metres above ground level
- 2.4 Plans used for the preparation of this Arboricultural Assessment include:
- Survey plan, by Base Surveying, Ref No. 04-14, dated 14.7.2004

- Site and levels plans, and elevations/sections, drawing numbers 23-37-1 Of 15 to 15of 15 inclusive, by Carol Voss, dated August 2004

2.5 All trees within the subject site were assessed.

2.6 Trees were numbered on attached survey

2.7 Five trees (5) were surveyed on this site and surrounds.

3.0 DISCUSSION

3.1 Condition of existing trees

3.1.1 Overall the health of the existing trees is fair to good and the condition of the existing trees also ranges from fair to good.

3.2 Tree removal

3.2.1 Trees 4 (Umbrella tree) and 5 (Norfolk Island Hibiscus) are proposed for removal. The trees are semi-mature, and not prominent in the landscape, and carry exemption from the Pittwater Council Tree Preservation Order due to their weed status/invasive root system (4) and irritant pods (5).

3.2.2 Tree 1 Canary Island Palm is proposed for removal, and an additional two mature Cabbage Tree palm specimens are proposed for planting adjacent to Tree 2 at landscaping stage of project.

3.3 Tree retention

3.3.1 Tree 2 Cabbage Tree Palm is to be retained on site, but relocated from its present position to the area outside the proposed kitchen in the southwest corner of the site.

3.3.2 Tree 1 Norfolk Island Pine within the subject site has been identified as a significant amenity tree, and proposed for retention. Specific recommendations follow to minimise impacts of proposed construction on tree.

3.4 Potential impacts on trees to be retained

3.4.1 Trees 2 is to be retained and relocated on site. If site conditions allow the tree can be transplanted in the warmer months to their proposed positions according to transplanting methodology appended in this report. If this is not possible, the tree will require removal to a temporary holding nursery, where they can be maintained until the landscaping phase of the project.

3.4.2 Tree 3 Norfolk Island Pine is a large significant specimen and the proposed dwelling is located some 3m from the tree's stem, and in addition a retaining wall and some fill up to 500mm in depth is proposed close to the tree. It is considered the tree can be successfully retained if the specific recommendations are implemented which include: hand excavation for masonry retaining wall and pier and beam footing construction if roots greater than 50mm in diameter are encountered; and a permeable gap-graded profile for any areas requiring fill above natural grade.

3.5 Impacts on visual amenity

3.5.1 The two semi-mature trees proposed for removal will have minimal impact on visual amenity as they are small specimens not prominent in the landscape. The proposed removal of Canary Island date palm would be offset by the addition of two mature Cabbage Tree palms to the site.

4 CONCLUSIONS

- 4.1 The main significant Norfolk Island Pine specimen on site is proposed for retention and could be retained successfully subject to specific recommendations designed to minimize the impacts of proposed construction.
- 4.2 Two mature palms are to be retained and relocated on the subject site.
- 4.3 Only two semi-mature trees of species exempt from Pittwater Council's Tree Preservation Order are proposed for removal, and this removal would not impact on local landscape visual amenity.

5.0 RECOMMENDATIONS

5.1 Specific

5.1.1

Tree 3 Norfolk Island Pine shall have hand excavation along proposed retaining wall to determine the presence of rootstock. If roots of 50mm or greater are encountered, they must not be severed but bridged with sufficient clearance for future expansion by installation of pier and beam footing system.

5.1.2 The area behind retaining wall is to be filled where necessary with a coarse, gap-graded material and only lightly compacted. If turf is used for surface cover it should be laid on 150mm of 90% coarse washed sand/10% organic matter mix. Alternatively mulch with flagging steps laid on gap-graded sand can be used or permeable pavers on no fines aggregate and lightly compacted. This will enable gaseous exchange and water infiltration to continue, which is essential to root health.

5.1.3 Remaining stubs on lower section of Norfolk Island Pine to be removed to stem collar.

5.1.4 Palm to be transplanted according to methodology below

5.2 Tree Protection Zones (TPZ)

5.2.1 Provide a Tree Protection Zone (TPZ) to all trees to be retained. This may be in the form of extended protective fencing, individual tree guards and other protective devices, depending on the specific requirements of each tree or group of trees to be retained.

5.2.2 The most appropriate procedure for protecting trees to be retained is to arrange a site meeting with the arborist and fencing contractor. This must be carried out prior to erecting any fencing or other tree protection devices.

To ensure the contractor has met with the arborist, and understands the requirements for protection of each tree as directed by the arborist, it is recommended the contractor provide written confirmation of that meeting and their understanding of those tree protection requirements.

It is important to remember that there may be many surface roots which could be damaged or crushed during site works and this issue needs to be addressed at the time of the site meeting with the contractor. This will require very specific and individual assessment of the protection devices used for each tree or group of trees.

- 5.2.3 The following recommendations for protection of trees to be retained are:
- Tree Protection Zones must be established and installed before any site works are carried out including any clearing or grading or approved tree removals;
 - Provide Tree Protection devices to all trees to be retained;
 - Provide Protection fencing as far as practicable from the trunk of the trees, and preferably outside the PRZ of the tree. Where possible the fencing should be placed to encircle the whole tree;
 - The most appropriate fencing is 1.8m chainlink with 50mm metal pole supports. During installation care must be taken to avoid damage to significant roots;
 - Nothing should occur inside the TPZ of the tree, so therefore all access to personnel and machinery, and storage of fuel, chemicals, cement or site sheds is prohibited;
 - Signage should explain exclusion from the fenced off areas and carry a contact name for access or advice; and
 - The TPZ may only be removed, altered, replaced or relocated with the authorisation of the project arborist.

5.3 Tree removal

- 5.3.1 The following recommendations for the removal of trees are:
- All tree parts are to be disposed of in an approved waste disposal area or recycled after chipping, or disposed of as firewood;
 - Any damage caused to retained trees during the removal of nominated trees must be reported to the site supervisor;
 - No unauthorized persons are allowed on the site during works unless authorized by the works supervisor;
 - No work is to be carried out without a supervisor present; and
 - The site is to be left in a clean and safe condition. No hazards, pruned materials, offcuts etc., are to be left on the site.

5.4 Minimising impacts on tree to be retained.

5.4.1 Arboricultural supervision

The arborist must supervise all works, particularly demolition, excavation, trenching, subgrade preparations, foundations and other associated procedures within the PRZ of the trees.

The removal of paved surfaces within the PRZ of trees to be retained must be carried out by hand to minimize damage to tree roots.

Each site visit and all observations, details etc, must be recorded by the project arborist.

- 5.4.2 Arboricultural advice and supervision of works is required before and during driveway installation within the PRZ of trees to be retained, including street trees and trees on neighbouring properties.

5.4.3 Construction access

Where practicable construction access for all vehicles must be located outside the Primary Root Zone (PRZ) of trees to be retained.

5.4.4 Landscape plantings

Any proposed planting locations within the PRZ of trees to be retained must remain flexible so as to avoid damage to existing roots.

In some cases, tubestock container size may be the only suitable size for planting within the root zone of a tree.

Mattocks and similar digging instruments must not be used within the dripline of trees to be retained. Planting holes should be dug by hand with a garden trowel, or similar small tool.

5.4.4 Mulching

The inclusion of a temporary mulch layer of composted leaf and woodchip to a depth of 75mm within TPZ will help retain soil moisture, protect soil from contaminants and reduce soil compaction.

5.5 Tree Pruning

5.5.1 Pruning methods and techniques

Contracted tree workers must have a minimum Level 2 qualification in Tree Surgery to carry out any pruning works on this site.

Pruning methods and techniques used are to be in accordance with these written specifications complying with Australian Standard AS 4373 – 1996 *Pruning of Amenity Trees*.

A copy of this document must be available and held on site by the supervisor.

5.5.2 Safe work practices

When pruning trees the following are to be complied with:

- Australian Standard AS4373 – 1996 *Pruning of Amenity Trees*;
and
- The Workcover Authority's *Code of Practice for the Amenity Tree Industry*, No. 34, May, 1998.

5.5.3 Supervision of pruning works

Pruning work is to be carried out under the direct supervision of a nominated qualified tree worker or the project arborist.

- 5.5.4 During all pruning works any defective or diseased tree parts encountered by tree workers are to be reported to the site supervisor.

5.6 Tree transplanting methodology

5.6.1 Tree proposed for transplanting is to be moved according to the following methodology:

The specimen of *Cabbage Palm* to be transplanted require the following preparation, work execution and aftercare in the order of listing:

1. Site meeting with site arborist and superintendent and tree transplanting contractor to discuss site access, identify location of services and machinery required for job and to mark existing north orientation of specimen.
2. Specimens to be pruned to AS 4373 to facilitate access for lifting equipment
3. If project timing permits, specimens to have trenches at extent of root plate to be moved pre-cut, roots treated with hormone and backfilled with coarse sandy mix to encourage new fibrous root growth.
4. Specimens to be moved in cooler early part of the day following watering rootplate to field capacity.
5. Specimens to be treated with anti-transpirant chemical to reduce moisture loss during operation.
6. Loose or torn roots are to be trimmed by sharp hand tools at excavation for root plate which is to be a minimum of 1.2m for Tree 2 and 1.5m for Tree 1.
7. Root plate is to be wrapped with suitable material such as hessian to prevent break up of soil and unnecessary moisture loss from root plate.
8. Trees are to be lifted from underneath root plate to prevent injury to stems and branches.
9. Trees are to be transplanted into pre-dug holes and positioned at their original soil levels and north point orientation.
10. Transplanted trees are to be backfilled and watered in with a soil mix compatible with the existing site soils. The holes must drain naturally or be drained with appropriate sub-surface drainage. Large amounts of organic matter are not to be placed at depth, as their decomposition creates anaerobic conditions, which is toxic for roots.
11. Trees are to be staked for stability with broad webbing around stems or branches to prevent damage from wire or cabling, for a minimum of twelve months.
12. Trees are to have TPZ erected at the dripline or minimum 3m from palm stem to allow for new root growth to establish without soil compaction and other deleterious actions adversely impacting on their recovery. (See specifications for establishment of TPZ)
13. Regular monitoring of irrigation requirements and monthly maintenance by transplanting contractor is required. Such maintenance may involve: irrigation, hormone or fertiliser treatment, mulching, pest and disease control, adjustment of cables for stability and soil pH adjustment.
14. Site arborist to inspect and report on transplanted trees for quarterly reporting compliance. Superintendent should notify site arborist if any change in the tree's health is noticed between inspection schedule times, as soon as possible.

5.7 General

- 5.7.1 General recommendations during development, construction and post-construction are as follows:
- No stock-piling should take place around the root zone.
Providing a regular supply of water to the tree during the period of works is recommended.
 - During this period it also recommended that the tree be given fortnightly applications of a rooting hormone such as Hormone 20® to encourage the development of new roots.

- Service trenches should not pass through a fenced area, although if this cannot be avoided, a qualified arborist should be present to supervise excavation, cut torn roots cleanly or redesign around roots.
Any roots that must be severed must be cut cleanly with a sharp handsaw. Tearing of roots is not acceptable.
- Any excavation within the PRZ of trees to be carried out by hand i.e. a trench along the line of cut adjacent to the tree should be carefully dug by hand to expose any roots. After cutting of roots, machinery may complete the excavation.
- Do not allow excavation vehicles or equipment to rip at, or remove the roots along the face of any excavation adjacent to a tree. In the event the vehicles 'grab' at roots during works, the machine operator must stop work immediately and allow the roots to be cut before continuing.
- Where significant tree roots are encountered which coincide with the desired location for a pier, the location should be moved so as to avoid the root/s. In the event this is not possible to achieve, an arborist should be consulted to assess the impacts of the removal of further significant roots on the trees health and stability.
- Regular monitoring of the tree during development works for unforeseen changes or decline will help maintain the tree in a healthy state.
- Irrigation – An arborist should determine whether irrigation should be carried out during extended periods of drought.
- Mulching - removal of mulch after construction to remove any contaminants. Replacement with a good quality mulch and addition of 10% organic matter will improve beneficial soil micro-organisms, retain moisture and improve aeration and water infiltration.
- Pest management – Monitoring is required as trees under stress are more prone to insect attack.
- Hazard Management – monitoring and management of the trees and re-assessment by a qualified arborist is required for adequate long-term safety of site users.



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- Barrell, J (1995) *Pre-development Tree Assessment from Trees and Building Sites*, Eds. Watson & Neely, International Society of Arboriculture, Illinois.
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APPENDIX A - TERMS AND DEFINITIONS



TERMS AND DEFINITIONS

The following relates to terms or abbreviations that may have been used in this report and provides the reader with a detailed explanation of those terms.

Age classes

- (I) = immature and refers to a well established but juvenile tree.
- (S) = semi-mature and refers to a tree at growth stages between immaturity and full size.
- (M) = mature and refers to a full sized tree with some capacity for further growth.
- (O) = over-mature and refers to a tree about to enter decline or already declining.

Condition refers to the tree's form and growth habit, as modified by its environment (aspect, suppression by other trees, soils) and the state of the scaffold (ie trunk and major branches), including structural defects such as cavities, crooked trunks or weak trunk/branch junctions. These are not directly connected with health and it is possible for a tree to be healthy but in poor condition.

Critical Root Zone (CRZ) refers to a radial offset of five (5) times the trunk DBH measured from the center of the trunk. Excavation within this area may seriously destabilize the tree. Fully elevated construction within this area is possible with specific root zone assessment.

Diameter at Breast Height (DBH) refers to the tree trunk diameter at breast height (1.4 metres above ground level)

Footprint refers to the area occupied by structures including dwellings driveways and paths.

Hazard refers to anything with the potential to harm health, life or property.

Health refers to the tree's vigour as exhibited by the crown density, leaf colour, presence of epicormic shoots, ability to withstand disease invasion, and the degree of dieback.

Primary Root Zone (PRZ) refers to a radial offset of ten (10) times the trunk DBH measured from the center of the trunk. Excavation is possible within one offset only with this area and subject to specific rootzone assessment.

Scaffold branch A primary structural branch of the crown

Stem/bark inclusion, a genetic fault and potentially a weak point of attachment.

SAFE USEFUL LIFE EXPECTANCY (SULE)

In a planning context, the time a tree can expect to be usefully retained is the most important long-term consideration. SULE is a system designed to classify trees into a number of categories so that information regarding tree retention can be concisely communicated in a non-technical manner.

SULE categories are easily verifiable by experienced personnel without great disparity.

A tree's SULE category is the life expectancy of the tree modified first by its age, health, condition, safety and location (to give safe life expectancy), then by economics (ie cost of maintenance: retaining trees at an excessive management cost is not normally acceptable), effects on better trees, and sustained amenity (ie establishing a range of age classes in a local population).

SULE assessments are not static but may be modified as dictated by changes in tree health and environment. Trees with a short SULE may be at present be making a contribution to the landscape but their value to the local amenity will decrease rapidly towards the end of this period, prior to their being removed for safety or aesthetic reasons.

For details of SULE categories see Appendix B, adapted from Barrell 1996.

Topping or heading is a pruning practice that results in removal of terminal growth leaving a cut stub end. Topping causes serious damage to the tree.

Tree Protection Zone (TPZ), generally the minimum distance from the center of the tree trunk where protective fencing or barriers are to be installed to create an exclusion zone.

Within Building Footprint (WBF) refers to those trees within the footprint of the proposed development.

APPENDIX B - SULE CATEGORIES



SULE CATEGORIES (after Barrell 1996, Updated 01/04/01)

The five categories and their sub-groups are as follows:

1. **Long SULE** - tree appeared retainable at the time of assessment for over 40 years with an acceptable degree of risk, assuming reasonable maintenance:
 - A. structurally sound trees located in positions that can accommodate future growth
 - B. trees which could be made suitable for long term retention by remedial care
 - C. trees of special significance which would warrant extraordinary efforts to secure their long term retention
2. **Medium SULE** - tree appeared to be retainable at the time of assessment for 15 to 40 years with an acceptable degree of risk, assuming reasonable maintenance:
 - A. trees which may only live from 15 to 40 years
 - B. trees which may live for more than 40 years but would be removed for safety or nuisance reasons
 - C. trees which may live for more than 40 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting
 - D. trees which could be made suitable for retention in the medium term by remedial care
3. **Short SULE** - tree appeared to be retainable at the time of assessment for 5 to 15 years with an acceptable degree of risk, assuming reasonable maintenance:
 - A. trees which may only live from 5 to 15 years
 - B. trees which may live for more than 15 years but would be removed for safety or nuisance reasons
 - C. trees which may live for more than 15 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting
 - D. trees which require substantial remediation and are only suitable for retention in the short term
4. **Removal** - trees which should be removed within the next 5 years
 - A. dead, dying, suppressed or declining trees
 - B. dangerous trees through instability or recent loss of adjacent trees
 - C. dangerous trees because of structural defects including cavities, decay, included bark, wounds or poor form.
 - D. damaged trees that are clearly not safe to retain.
 - E. trees which may live for more than 5 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting.
 - F. trees which are damaging or may cause damage to existing structures within the next 5 years.
 - G. trees that will become dangerous after removal of other trees for the reasons given in (a) to (f).
 - H. trees in categories (a) to (g) that have a high wildlife habitat value and, with appropriate treatment, could be retained subject to regular review.
5. **Small, young or regularly pruned** - Trees that can be reliably moved or replaced.
 - A. small trees less than 5m in height.
 - B. young trees less than 15 years old but over 5m in height.
 - C. formal hedges and trees intended for regular pruning to artificially control growth.

APPENDIX C – SCHEDULE OF SURVEYED TREES



SCHEDULE OF SURVEYED TREES`

Tree 1

Phoenix canariensis (Canary Island Date Palm) is a mature specimen of 800mm in diameter, with an approximate height of 12m and crown spread of 3m.

The tree is in fair health and condition and has a safe, useful life expectancy of 2D.

Tree 2

Livistona australis (Cabbage Tree Palm) is a mature specimen of 450 mm in diameter, with an approximate height of 14m and crown spread of 2m.

The tree is in fair health and condition and has a small and high crown. The tree has a SULE of 2D.

Tree 3

Araucaria heterophylla (Norfolk Island Pine) is a mature specimen of 1200mm in diameter, with an approximate height of 18m and crown spread of 9m.

The tree is in good health and condition, and has received some amateur pruning of lower branches closest to the existing house. The tree has a SULE of 1B.

Tree 4

Schefflera actinophylla (Umbrella Tree) is a semi-mature specimen of 100/100mm in diameter, and an approximate height of 3m and crown spread of 2m. The tree is in fair health and condition and receives a SULE rating of 2B.

The species is exempt from Pittwater Council's Tree preservation Order.

Tree 5

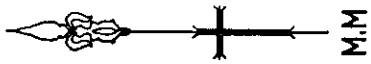
Lagunaria patersonni (Norfolk Island Hibiscus) is a semi-mature specimen of 150mm in diameter, and an approximate height of 3.5m and crown spread of 2m. The tree is in fair health and condition and receives a SULE rating of 2B.

The species is exempt from Pittwater Council's Tree preservation Order.

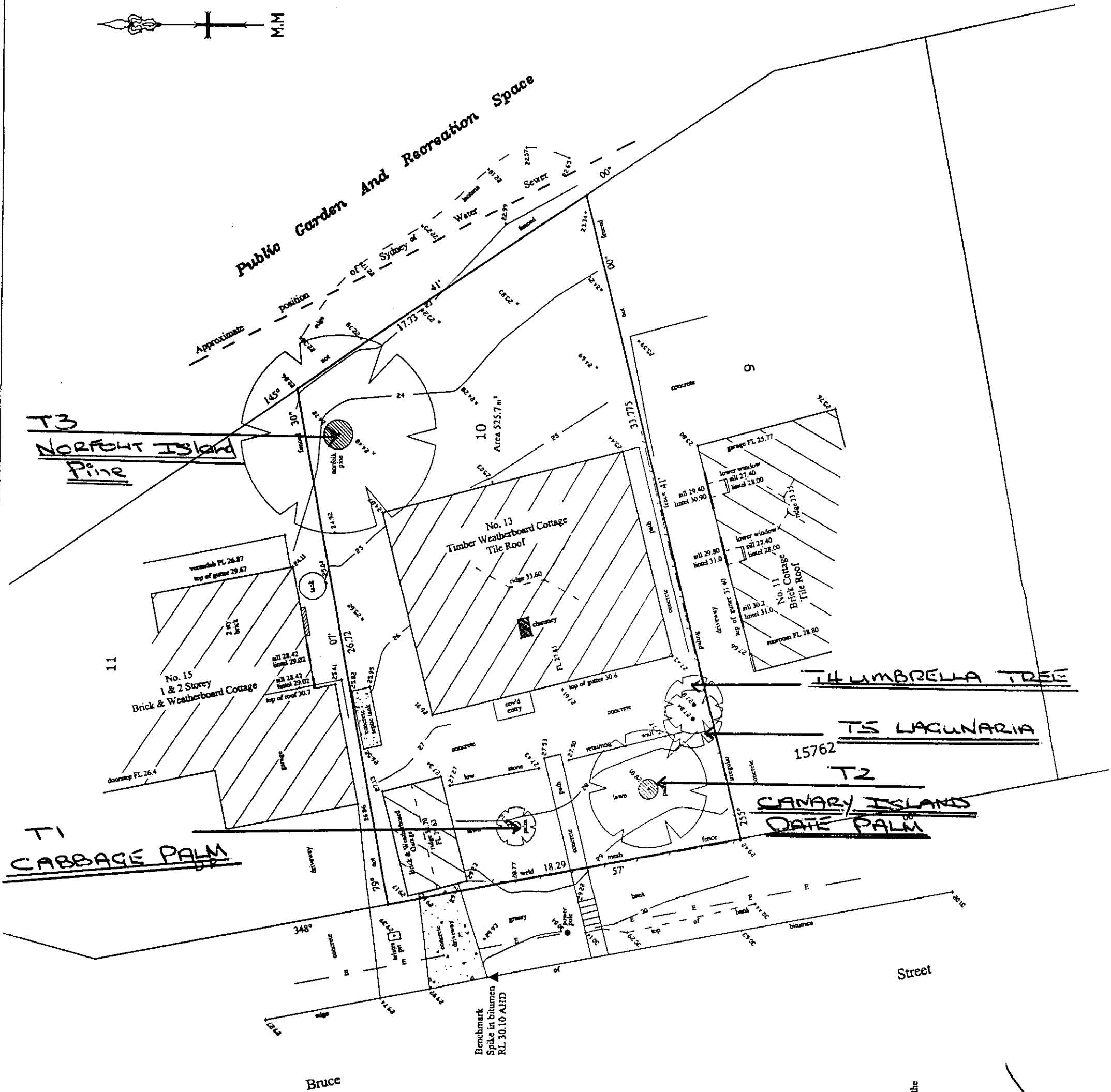
APPENDIX D - TREE LOCATION PLAN



TREE PLAN FOR 13 BRUCE STREET WARRIEWOOD



Public Garden And Recreation Space



- NOTES:**
- Levels are on the Australian Height Datum (A.H.D.).
 - Origin of levels SSM 40537 RL 31.391 AHD
 - Boundaries not marked.
 - Tree trunks and spreads are diagrammatic only.
 - No investigation of underground services has been made. Contact the authorities prior to any excavation on or near the site.
 - The boundaries should be marked prior to any construction near the boundaries.
 - E - Denotes overhead electricity wires.
 - Covenant BR33965

LAND AND CONSTRUCTION SURVEYING
 SIMON WARREN
 10 BAMBIL RD, BEROOWRA
 MOB 0412448259 FAX 94564212

SCALE
 1:200
DATE
 14-7-2004
REF. No.
 04-14

CLIENT: IAN WALTERS
PLAN SHOWING DETAIL & LEVELS OVER
LOT 10 IN DP 15762
13 BRUCE ST., WARRIEWOOD
L.G.A. FITZWATER